



# WinSLAMM v 9.4 User's Guide

New Features





This User's Guide shows only the updated or new features available in Version 9.4.

# Start-Up Hints

- \*\*Press F1 on any screen within the program to see the corresponding Help File Topic\*\*
- \*\*Throughout this User's Guide, the text in red walks you through the program\*\*
- \*\*The User may need to press Enter in various input screens to activate the next data input\*\*

# Summary of New Features

- Default Model Options - Added
- Saving to an Earlier Version - Added
- File Update Options – Automatically updates v 9.0 – 9.3 files to v 9.4
- Detailed Output Options – Additional output added for various control practices
- Lamella Plates – Added to the Hydrodynamic Control Device and the Catchbasin Control Device
- Wet Detention Pond to Biofiltration Routing – Added (hydrograph and particle size distribution)



# Default Model Options

**Program Options**

Detailed Output File Options

**Default Model Options**

- Suppress Control Practice Review Warning Messages
- Suppress 'No Street Cleaning with Catchbasin Cleaning' Warning Message
- Turn 'Save File Upon Exit' Message Off
- Turn 'Save Outfall Runoff and Particulate Loading for WinDETPOND Analysis' Output Option On
- Suppress the Wet Detention Pond Overflow Warning Message

Default Peak Flow to Average Flow Ratio

Standard Particle Size Distribution File

Default Monthly Temperature	
January	0
February	0
March	0
April	0
May	0
June	0
July	0
August	0
September	0
October	0
November	0
December	0

**In version, 9.4.0, a Default Model Options form was added. This form can be used to suppress selected warning messages, select a particle size distribution that will be used for all control practices and set the default monthly temperature values.**

File Update Options      Cancel Changes      Save .INI File



# Saving to an Earlier Version



# Saving Down to an Earlier Version

The screenshot shows the WinSLAMM Data File interface. The 'File' menu is open, and 'Save As Earlier Version...' is selected. A sub-menu is visible, showing three options: 'Version 9.3', 'Version 9.2', and 'Version 9.1'. A red box highlights these options, and a red arrow points to 'Version 9.1'.

The 'Source Area Parameters' table is partially visible, showing columns for P, O, S, B, and Source Area Parameters. The 'Entered' column is also visible.

The 'Current File Data Entered' section shows the following Land Use Areas:

Land Use Area	Area (Acres)
Residential Area:	100.00 Acres
Institutional Area:	0.00 Acres
Commercial Area:	0.00 Acres
Industrial Area:	0.00 Acres
Other Urban Area:	0.00 Acres
Freeway Area:	0.00 Acres
<b>Total Area:</b>	<b>100.00 Acres</b>

The 'Exit Program' button is visible at the bottom left, and a yellow bar at the bottom indicates 'Press F1 for Help'.

**To save and run the data file in an earlier version, Select 'File', then 'Save As Earlier Version...', then select the desired version.**





# File Update Options

**Program Options**

**Detailed Output File Options**

**Biofilters**

- Detailed Biofilter Output
- Irreducible Concentration Detailed Output
- Particulate Reduction Output
- Stage-Outflow
- Stochastic Seepage Rate Detail
- Water Balance

**Catchbasins**

- Performance by Event Output
- Performance By Step Output
- Stage-Inflow Data
- Stage-Outflow

**Flow Duration Curve Data**

- Detailed Data
- Plotting Calculations

**Freeway Data**

- Freeway Washoff Detail
- Critical Particle Size Calculation

**Grass Swales**

- Hydraulics and Concentration by Event
- Hydraulics Detailed Output
- Incremental Performance Output
- Irreducible Concentration Detailed Output
- Particulate Reduction Output

**Hydrodynamic Devices**

- Detailed Output
- Performance By Event
- Stage-Inflow
- Stage-Outflow

**Porous Pavement**

- Detailed Output
- Stage-Outflow
- Stochastic Seepage Rate Detail

**Default Model Options**

**Street Cleaning**

- Street Dirt Plot
- Street Dirt Removal
- Washoff or Street Cleaning Detail

**Wet Detention Ponds**

- Detailed Output
- Outfall Discharge Hydrograph
- Pond Stage-Area-Volume Data
- Stage-Outflow
- Stone Weeper Detailed Output
- Water Balance Summary of All Ponds

**File Update Options**

**Cancel Changes**

**Save .INI File**

**To update version 9.0, 9.1, 9.2, or 9.3 .dat files to version 9.4, select the File Update Options button.**

**Program Options**

**.DAT File Update Information**

Version 9.3 to Version 9.4

Version 9.1 to Version 9.2

Version 9.0 to Version 9.1

**Version 9.2 to Version 9.3**

Version 9.2 to Version 9.3      Note: To update files properly, this information must be filled in regardless of the file contents

Grass Swale Update Information

Swale Retardance Factor:

Typical Grass Height (in):

Select Particle Size File

C:\Program Files\WinSLAMM\NURP.CPZ

Biofilter Update Information

Engineered Soil Type:

Percent solids reduced to engineered soil (0-100):

Engineered Soil Infiltration Rate (in/hr):

Select Particle Size File

C:\Program Files\WinSLAMM\NURP.CPZ

Continue      Save File Update Information to .INI File      Cancel Changes      Reload .INI File       Do Not Show Rename File Option

**Click on the tab representing the file version you have and enter the relevant data.**

**Enter data for all subsequent versions until the version 9.4 file will have all the needed data.**

Program Options

.DAT File Update Information

Version 9.3 to Version 9.4

Version 9.1 to Version 9.2

Version 9.0 to Version 9.1

**Version 9.2 to Version 9.3**

Version 9.2 to Version 9.3 Note: To update files properly, this information must be filled in regardless of the file contents

Grass Swale Update Information

Swale Retardance Factor: C

Typical Grass Height (in): 6.0

Select Particle Size File

C:\Program Files\WinSLAMM\NURP.CPZ

Biofilter Update Information

Engineered Soil Type: User Defined

Select Particle

C:\Program Files\WinSLAMM\NURP.CPZ

Continue Save File Update Information to .INI File Cancel Changes Reload .INI File  Do Not Show Rename File Option

**Each time a \*.DAT file is updated through the \*.INI file, it will ask if the user would like to rename the file. The Do Not Show Rename File Option can be selected if the user chooses to overwrite each \*.DAT file.**

Program Options

.DAT File Update Information

Version 9.3 to Version 9.4

Version 9.1 to Version 9.2

Version 9.0 to Version 9.1

**Version 9.2 to Version 9.3**

Version 9.2 to Version 9.3      Note: To update files properly, this information must be filled in regardless of the file contents

Grass Swale Update Information

Swale Retardance Factor    C

Typical Grass Height (in)    6.0

Select Particle Size File

C:\Program Files\WinSLAMM\NURP.CPZ

[Unreadable]

in due    0

ion    0.000

C:\Program Files\WinSLAMM\NURP.CPZ

Continue    **Save File Update Information to .INI File**    Cancel Changes    Reload .INI File     Do Not Show Rename File Option

**Program Options**

**.DAT File Update Information**

Version 9.3 to Version 9.4

**Version 9.1 to Version 9.2**      Version 9.0 to Version 9.1      Version 9.2 to Version 9.3

Version 9.1 to Version 9.2      Note: To update files properly, this information must be filled in regardless of the file contents

Suppress Porous Pavement update warnings

Select Standard Runoff Coefficient File name applied to all .DAT Files: C:\Program Files\WinSLAMM\WI\_SL06 Dec06.rsv

Standard Street Delivery File names applied to all .DAT Files:

Select Residential Land Use .STD File	C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Select Institutional Land Use .STD File	C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Select Commercial Land Use .STD File	
Select Industrial Land Use .STD File	
Select Other Urban Land Use .STD File	
Select Freeway Land Use .STD File	

Continue      Save File Update Information to .INI File      Cancel Changes      Reload .INI File       Do Not Show Rename File

**An \*.INI file was distributed with the latest version of WinSLAMM containing all the updated default parameters. Therefore, unless there is a special situation, the user should not have to modify these files. This slide shows some of the files specified in the distributed \*.INI file. See the “Updating .dat Files” Help File Topic for more information.**



# Detailed Output Options



# Detailed Output Options for Control Devices

**Program Options**

**Detailed Output File Options**

**Biofilters**

- Detailed Biofilter Output
- Irreducible Concentration Detailed Output
- Particulate Reduction Output
- Stage-Outflow
- Stochastic Seepage Rate Detail
- Water Balance

**Catchbasins**

- Performance by Event Output
- Performance By Step Output
- Stage-Inflow Data
- Stage-Outflow

**Flow Duration Curve Data**

- Detailed Data
- Plotting Calculations

**Freeway Data**

- Freeway Washoff Detail
- Critical Particle Size Calculation Detailed Output File

**Grass Swales**

- Hydraulics and Concentration by Event
- Hydraulics Detailed Output
- Incremental Performance Output
- Irreducible Concentration Detailed Output
- Particulate Reduction Output

**Hydrodynamic Devices**

- Detailed Output
- Performance By Event
- Stage-Inflow
- Stage-Outflow

**Porous Pavement**

- Detailed Output
- Stage-Outflow
- Stochastic Seepage Rate Detail
- Surface Seepage Rate
- Water Balance

**Street Cleaning**

- Street Dirt Plot
- Street Dirt Removal
- Washoff or Street Cleaning Detail

**Wet Detention Ponds**

- Detailed Output
- Outfall Discharge Hydrograph
- Pond Stage-Area-Volume Data
- Stage-Outflow
- Stone Weeper Detailed Output
- Water Balance Summary of All Ponds

Uncheck All Detailed Output File Options

Check All Detailed Output File Options

**File Update Options**

**Cancel Changes**

**Save .INI File**

Select the Detailed Output needed by checking the box next to the output.

The Output List has been updated for version 9.4.0.





# Lamella Plates

**Land Use: Residential**  
**Source Area: Roofs 1**  
**Device Number 1**

**Hydrodynamic Control Device General Information - Enter for Both Single Chamber and Proprietary Devices**

Total Source Area (ac)	2.06
Area Served by Device (ac)	2.06
Number of Devices	1
Device Density (units/ac)	0.500

Select **Critical Particle Size file name:**  
 C:\Program Files\WinSLAMM\NURP.CPZ

**Model Hydrodynamic Device with Lamella Plates or Settling Tubes**

<input checked="" type="checkbox"/> Fraction of device area with plates or tubes	0.80
Average tube diameter or distance between plates (ft)	1.00
Number of plates or tubes a vertical line will intersect	3

**For Device Cleaning, Select Either**

**Device Cleaning Dates**

Device Cleaning No.	Device Cleaning Date (mm/dd/yy)
1	
2	
3	
4	
5	

OR

**Device Cleaning Frequency**

- Monthly
- Three Times per Year
- Semi-Annually
- Annually
- Every Two Years
- Every Three Years
- Every Four Years
- Every Five Years
- Never

**Single Chamber Device Characteristics**

1 - Typical Outlet Pipe Slope (ft/ft)	0.0100
Typical Device Sump Surface Area (sf)	28.0
4 - Device Depth from Sump Bottom to Street Level (ft)	8.00
Inflow Hydrograph Peak to Average Flow Ratio	3.8
5 - Minimum Allowable Scour Depth Below Outlet Invert (ft)	1.0
Maximum Flow to In-Line Sump (cfs)	N/A - Click to Activate
6 - Diameter of Orifice that Controls Flow to In-Line Sump (ft)	0.75
7 - Inflow Orifice Invert Elevation (ft)	6.00
8 - Length (ft) of Overflow Structure Acting as a Sharp-Crested Weir	5.00
9 - Elevation of Overflow Structure to Bypass In-Line Sump (ft above sump base)	7.00

**Or Use Proprietary**

1 - Average Sump Depth below Device Outlet Invert (ft)	
Depth of Sediment in Device at Beginning of Study Period (ft)	
2 - Typical Outlet Pipe Diameter (ft)	
Typical Outlet Pipe Manning's n	
3 - Typical Outlet Pipe Slope (ft/ft)	
Inflow Hydrograph Peak to Average Flow Ratio	
5 - Minimum Allowable Scour Depth Below Outlet Invert (ft)	
Device Sump Surface Area (sf)	

Delete Control    Cancel    Continue

**Lamella plates can now be modeled using version 9.4.0.**

**Enter the data describing the plates.**

**A schematic is available in the Help File to illustrate each data value.**

## Catchbasin Control Device

Total Basin Area: 100.00 acres

1. Area served by catchbasins (acres):  2a. Catchbasin density (cb/ac):  2b. Number of Catchbasins: 7. Typical outlet pipe slope (ft/ft): 8. Typical catchbasin sump surface area (sf): 9. Catchbasin Depth from Sump Bottom to street level (ft): 10. Inflow Hydrograph Peak to Average 

**In version 9.4.0, the ability to model Lamella Plates was added to the Catchbasin and Hydrodynamic Control Devices.**

Typical  
Catchbasin

- Low density residential (0.25 inlets/acre)  
 Medium density residential (0.5 inlets/acre)

- Shopping center (1.2 inlets/acre)  
 Industry (0.8 inlets/acre)  
 Freeways (1 inlet/acre)

**If modeling a catch basin with an overflow structure, a hydrodynamic device at the drainage level system, or a system with Lamella Plates, select the “Inflow Bypass and Lamella Plate Data” button.**

 Catchbasin Cleaning Frequency

- Monthly  
 Three Times per Year  
 Semi-Annually  
 Annually  
 Every Two Years  
 Every Three Years  
 Every Four Years  
 Every Five Years

4

5

**Inflow Bypass and Lamella  
Plate Data**

Continue

Clear

Cancel

Delete Control

Enter the Maximum Flow to the In-Line Sump if known. Or enter the characteristics of the diversion and the program will calculate the maximum flow.

The data required for this control device when using the bypass is the same data required for the hydrodynamic device.

**Catchbasin Flow Bypass Data**

**Maximum Flow to In-Line Sump:**  
9999.00 Maximum Flow to In-Line Sump (cfs)

**Flow Inlet Diversion Elevation**  
Diameter of Orifice that Controls Flow to In-Line Sump (ft)  
Inflow Orifice Invert Elevation (ft)  
Length (ft) of Overflow Structure Acting as a Sharp-Crested Weir  
Elevation of Overflow Structure to Bypass Inline Sump (ft above sump base)

**Lamella Plates or Tube Settlers**  
Fraction of device area with plates or tubes  
Average tube diameter or distance between plates (ft):  
Number of plates or tubes that a vertical line will intercept

Clear and Exit Continue

Enter the data for the Lamella Plates if relevant.



# Wet Detention Pond to Biofiltration Hydrograph and Particle Size Routing



## Biofiltration Control Device

Land Use: Residential  
Source Area: Roofs 1

Total Area: 5 acres  
Biofilter Number 1

### Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device(s)

- Rooftop 1
- Rooftop 2
- Rooftop 3
- Rooftop 4
- Rooftop 5
- Paved Parking/Storage 1
- Paved Parking/Storage 2
- Playground 1
- Playground 2
- Driveways 1
- Driveways 2
- Driveways 3
- Sidewalks/Walks 1
- Sidewalks/Walks 2
- Large Landscaped Area 1
- Undeveloped Area
- Small Landscaped Area 1
- Small Landscaped Area 2
- Small Landscaped Area 3
- Other Pervious Area
- Other Dir Cnctd Imp Area
- Other Part Cnctd Imp Area
- Large Turf Areas
- Undeveloped Areas
- Other Pervious Areas
- Other Directly Conctd Imp
- Other Partially Conctd Imp

### Device Properties

Top Area (sf)	
Bottom Area (sf)	
Total Depth (ft)	
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0-1)	
Infil. Rate Fraction-Sides (0-1)	
Rock Filled Depth (ft)	
Rock Fill Void Ratio (0-1)	
Engineered Soil Type	
Engineered Soil Infiltration Rate (in/hr)	
Engineered Soil Depth (ft)	
Engineered Soil Void Ratio (0-1)	
Percent solids reduction due to Engineered Soil (0 -100)	
Inflow Hydrograph Peak to Average Flow Ratio	
Number of Devices in Source Area or Land Use	1

Add Outlet/ Discharge

### Outlet/Discharge Options

- 1. Sharp Crested Weir
- 2. Broad Crested Weir

Change Geometry

Copy Biofilter Data

Paste Biofilter Data

### Select Native Soil Infiltration Rate

- Sand - 8 in/hr
- Loamy sand - 2.5 in/hr
- Sandy loam - 1.0 in/hr
- Loam - 0.5 in/hr
- Silt loam - 0.3 in/hr
- Sandy silt loam - 0.2 in/hr
- Clay loam - 0.1 in/hr
- Silty clay loam - 0.05 in/hr
- Sandy clay - 0.05 in/hr
- Silty clay - 0.04 in/hr
- Clay - 0.02 in/hr
- Rain Barrel/Cistern - 0.00 in/hr

Route Through Wet Detention Pond First

Use Random Number Generation to Account for Infiltration Rate Uncertainty

Select Particle Size File

Refresh Schematic

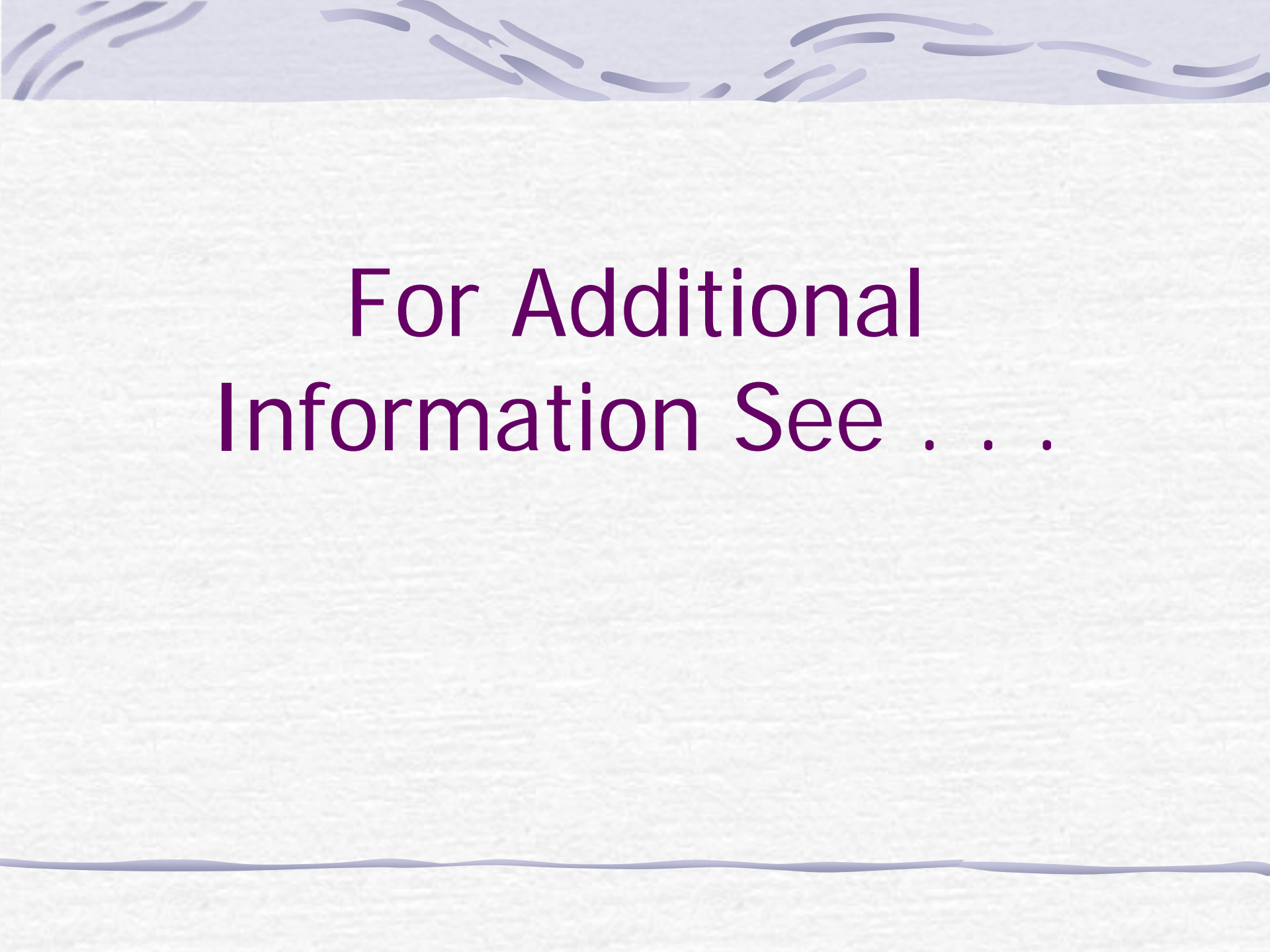
Delete

Cancel

Continue

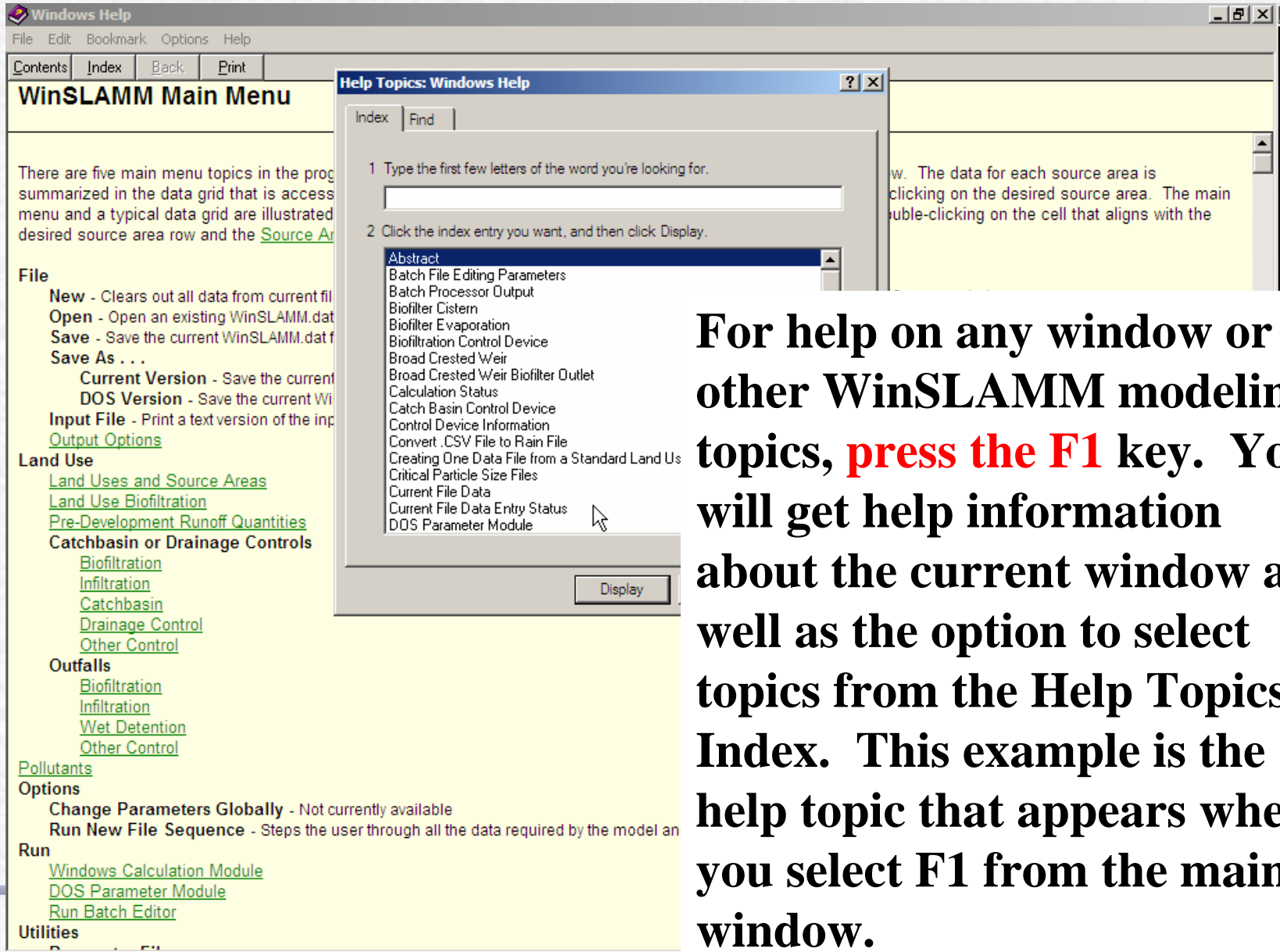
**In version 9.4.0, the model will route the hydrograph and particle size distribution from a wet detention pond to a biofilter. This routing can only be done at the Outfall in version 9.4.0.**

**Select "Route Through Wet Detention Pond First" and enter the data for the Wet Detention Pond.**



For Additional  
Information See . . .

# The Context-Sensitive Help in the Program



**For help on any window or on other WinSLAMM modeling topics, **press the F1** key. You will get help information about the current window as well as the option to select topics from the Help Topics Index. This example is the help topic that appears when you select F1 from the main window.**



# Model Documentation Included on the CD

- WinSLAMM Introduction and Basics
- Integration of Water Quality and Design Objectives
- Sources of Stormwater Pollutants
- Stormwater Quality Controls in WinSLAMM
- Using SLAMM
- Biofiltration Example
- Detention Pond Design
- National Stormwater Quality Database (NSQD, version 1.1)